Goa Vidyaprasarak Mandal's
Gopal Govind Poy Raiturcar College of Commerce and Economics
Ponda –Goa
B.Com. (Semester - IV) Examination, April 2018
STATISTICAL TECHNIQUES

Duration: 2 hours **Marks : 80**

Instructions : (i) Attempt All Questions.
(ii) Figure to the right indicate full marks.
(iii) Graph papers will be supplied on request.

Q 1 A. How does a scatter diagram help in studying the correlation between two variables in respect of both nature and extent? (3)

Q 1 B. The marks of students in class work and annual examination are given below

Class work	12	14	23	18	10	19
Annual exam	68	78	85	75	70	74

Calculate the coefficient of correlation by Karl Pearson's method. (6)

Q 1 C. Compute Spearman's coefficient of rank correlation from the following data

Rank x	7	6	3	2	3	1	3
Rank y	6	4	7	4	1	1	3

(7)

OR

Q 1 X. Write the properties of regression coefficients. (3)

Q 1 Y. Calculate the coefficient of correlation by Karl Pearson's method for the following data

x	5	10	5	11	12	4
y	1	6	2	8	5	4

(6)

Q 1 Z. The following data relates to advertising expenditure (in lakhs of rupees) and their corresponding sales (in crores of rupees)

Advertising expenditure	10	12	15	23	20
Sales	14	17	23	25	21

Estimate the sales corresponding to advertising expenditure of ₹30 lakhs. (7)

Q 2 A. Define the terms – i) Independent events ii) mutually exclusive events. (3)

Q 2 B. There are 60 articles of which 20 are defective and 40 are non defective. If a sample of 10 is selected, find the probability of getting exactly 4 defective and 6 non defective articles. (6)

Q 2 C. Calculate the coefficient of correlation by Karl Pearson's method from the following data

x	5	9	13	17	21
y	12	20	25	33	35

(7)

OR

Q 2 X. Write the set corresponding to the events in the following experiment: Two dice are rolled. The event is the sum of the numbers on the uppermost face is greater than 9. (3)

Q 2 Y. Tickets are numbered from 1 to 100. They are well shuffled and a ticket is drawn at random. What is the probability that the drawn ticket has
i) a number which is not divisible by 7?
ii) a number which is a square?
(6)

Q 2 Z. Calculate Spearman's Rank correlation for the following data giving ranks awarded by two judges to 10 participants in a musical contest

Rank by Judge A	10	6	2	1	7	9	8	4	5	3
Rank by Judge B	8	5	1	2	7	10	9	3	6	4

(7)

Q 3 A. Explain briefly the method of multistage sampling. (3)

Q 3 B. A petrol pump owner sells on an average ₹ 80,000 worth of petrol on a rainy day and an average of ₹ 95,000 on clear days. Statistics from the Meteorological Department show that the probability is 0.76 for clear weather and 0.24 for rainy weather on coming Monday. Find the expected value of petrol sale on coming Monday. (6)

Q 3 C. A coin is tossed 8 times. What is the probability of getting at least six heads? (7)

OR

Q 3 X. Describe systematic sampling giving suitable examples. (3)

Q 3 Y. A player tosses 3 coins. He wins ₹5 if 3 heads appear, ₹3 if 2 heads appear, ₹1 if 1 head appears. On the other hand, he loses ₹15 if 3 tails appear. Find his expected gain. (6)

Q 3 Z. In a town, 10 accidents took place in a span of 50 days. Assuming that the accidents per day follow the Poisson Distribution, find the probability that there will be three or more accidents in a day. [Take $e^{-0.2} = 0.8187$] (7)

Q 4 A. If the mean of a Poisson distribution is 2 find P ($x \neq 0$). (Given $e^{-2} = 0.1353$) (3)

Q 4 B. A machine is producing ball bearings with a diameter of 0.5 inches. It is known that the standard deviation of the ball bearings is 0.005 inch. A sample of 100 ball bearings is selected and their average diameter is found to be 0.48 inch. Determine 99% confidence interval. (6)

Q 4 C. The mean weight of 200 students is 45 kg with a standard deviation of 15 kg. Assuming distribution of weight to be normal, find i) the number of students with weight between 30 kg and 60 kg ii) the percentage of students with weight more than 60 kg.
(Area under the standard normal curve between t = 0 and t = 1 is 0.3413) (7)

OR

Q 4 X. If mean of a binomial distribution is 40 and standard deviation is 6, find n, p and q. (3)

Q 4 Y. In a survey carried out in a large city, 170 households out of 250 owned at least one pet. Find the 95% confidence interval for the proportion of households in the city who own at least one pet. (6)

Q 4 Z. A manufacturer of screws has found that 3% of the screws produced are defective. If a random sample of 300 screws is examined what is the probability that the proportion defective is between 0.02 and 0.035?
(Area under the standard normal curve between i) t = 0 and t = 1.02 is 0.3461
ii) t = 0 and t = 0.51 is 0.1950) (7)

Q 5 A. What are control charts? Explain their utility. (3)

Q 5 B. A sample of 100 tyres is taken from a lot. The mean life of the tyres is found to be 39,350 km with a standard deviation of 3260 km. Could the sample come from a population with a mean life of 40,000 km at 1% L.O.S? (6)

Q 5 C. Construct a p-chart for the following data and write your conclusion

Sample Number (Each of 100 items)	1	2	3	4	5	6	7	8	9	10
Number of defectives	5	3	3	6	5	6	8	10	10	4

(7)

OR

Q 5 X. Explain Null hypothesis and Alternative hypothesis with an example. (3)

Q 5 Y. A wholesaler of eggs claims that only 4% of the eggs supplied by him are bad. A random sample of 600 eggs contained 36 bad eggs. Test the claim of the wholesaler at 5% L.O.S (6)

Q 5 Z. The following data give the weight (in gms) of metal sheets produced by a machine in ten samples of size 5

Sample number	1	2	3	4	5	6	7	8	9	10
Mean ($\overline{X}$)	3.12	3.04	3.06	3.02	3.06	3.08	3.08	3.00	3.20	2.98
Range (R)	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1

Calculate the control limits in respect of $\overline{X}$ - Chart. Draw the chart and comment on the state of control. [For sample size 5, $A_2 = 0.58$] (7)

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